

(12) UK Patent Application (19) GB (11) 2 372 309 (13) A

(43) Date of A Publication 21.08.2002

(21) Application No 0103559.1

(22) Date of Filing 14.02.2001

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(51) INT CL⁷
F25D 17/08

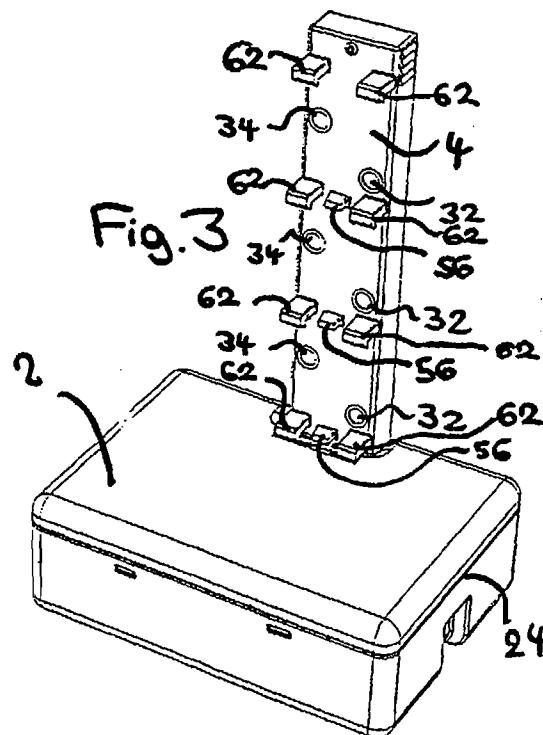
(52) UK CL (Edition T)
F4H H1A H1B H1K H10
B8P PV

(56) Documents Cited
GB 2333828 A GB 2131537 A
GB 1594507 A GB 1558825 A
GB 1458165 A GB 1400685 A

(58) Field of Search
UK CL (Edition S) B8P PV , F4H H1A H1B H2A H2B
INT CL⁷ F25D 17/08

(54) Abstract Title
Goods storage apparatus

(57) Goods storage apparatus comprises at least one thermally insulating crate (2) and a crate-receiving post or wall unit (4). Each crate has an inlet and an outlet for temperature controlled air. The post is adapted to receive a plurality of said crates. The post comprises means to provide temperature controlled air. The temperature controlled air is circulated in use from the means for providing temperature controlled air to each of the crates received by the post. The post has a self-latching locking system for locking all of the inserted crates (2). The locking system may be released by the customer using a key. The locking system may include a movable catch (56) and fixed catches (62).



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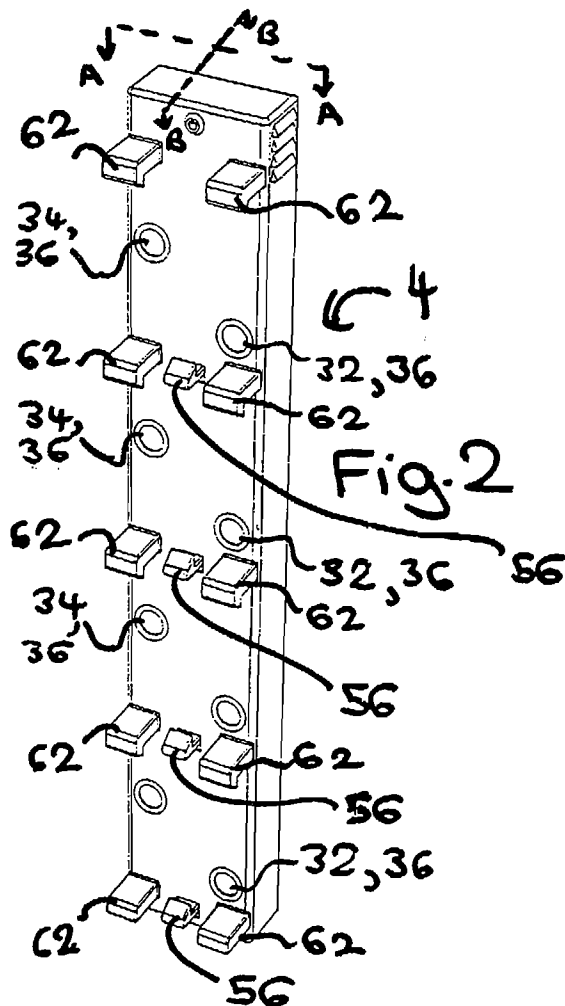
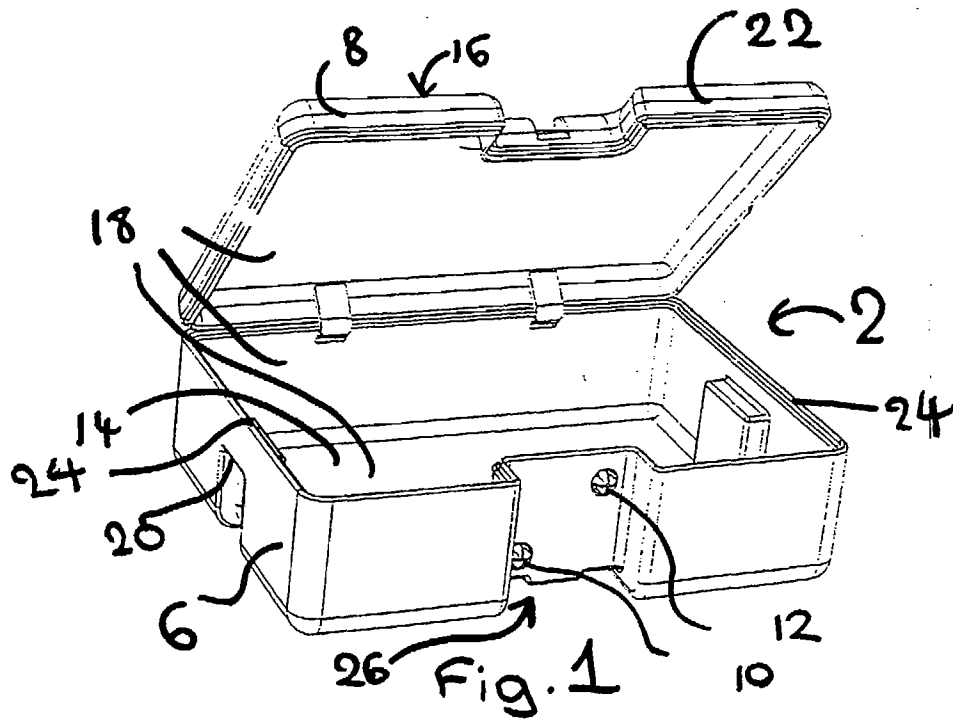


Fig. 3

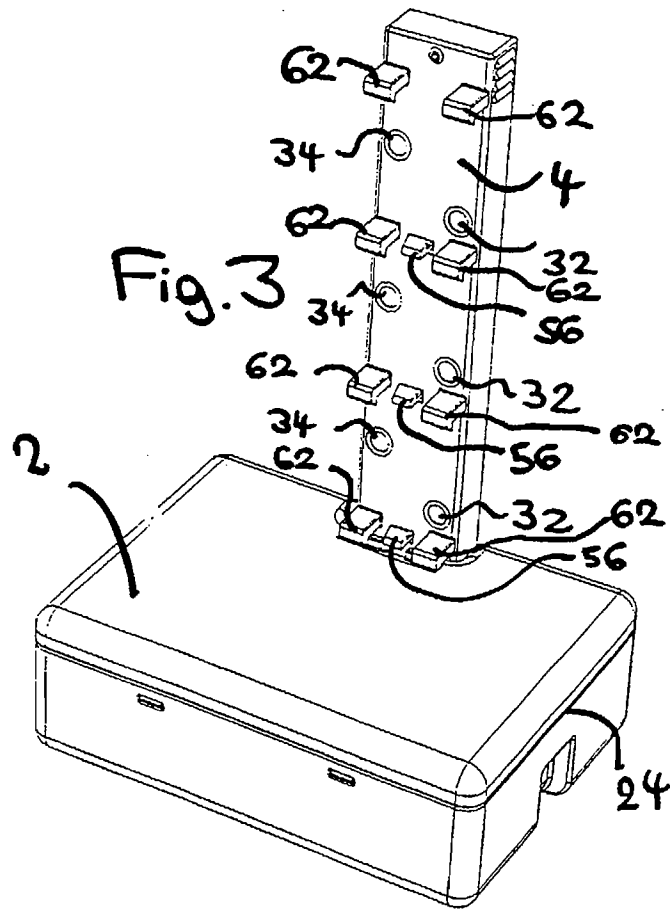
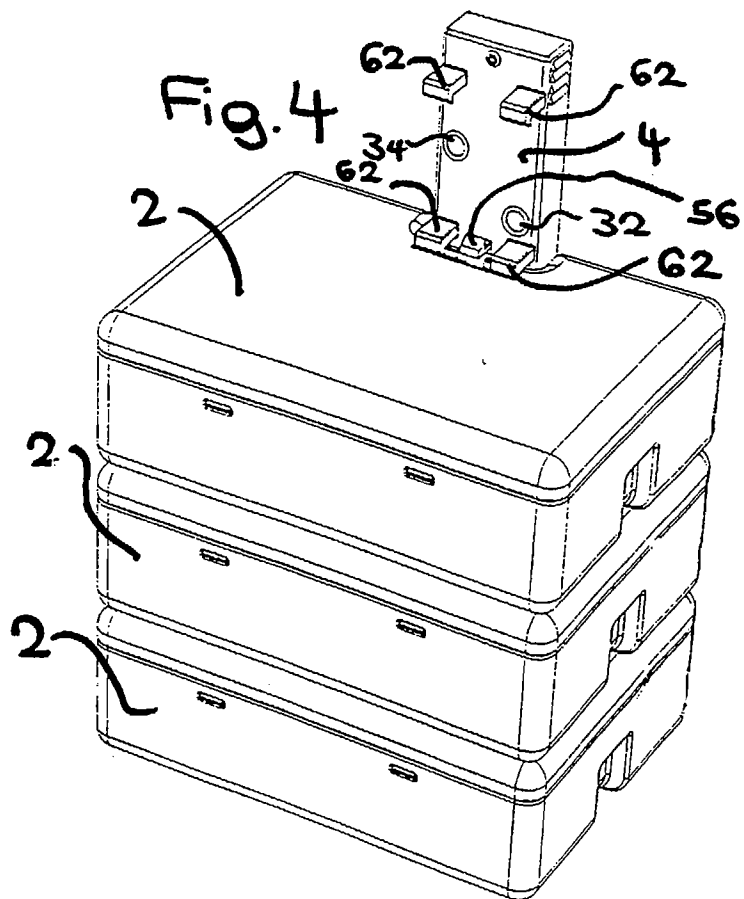


Fig. 4



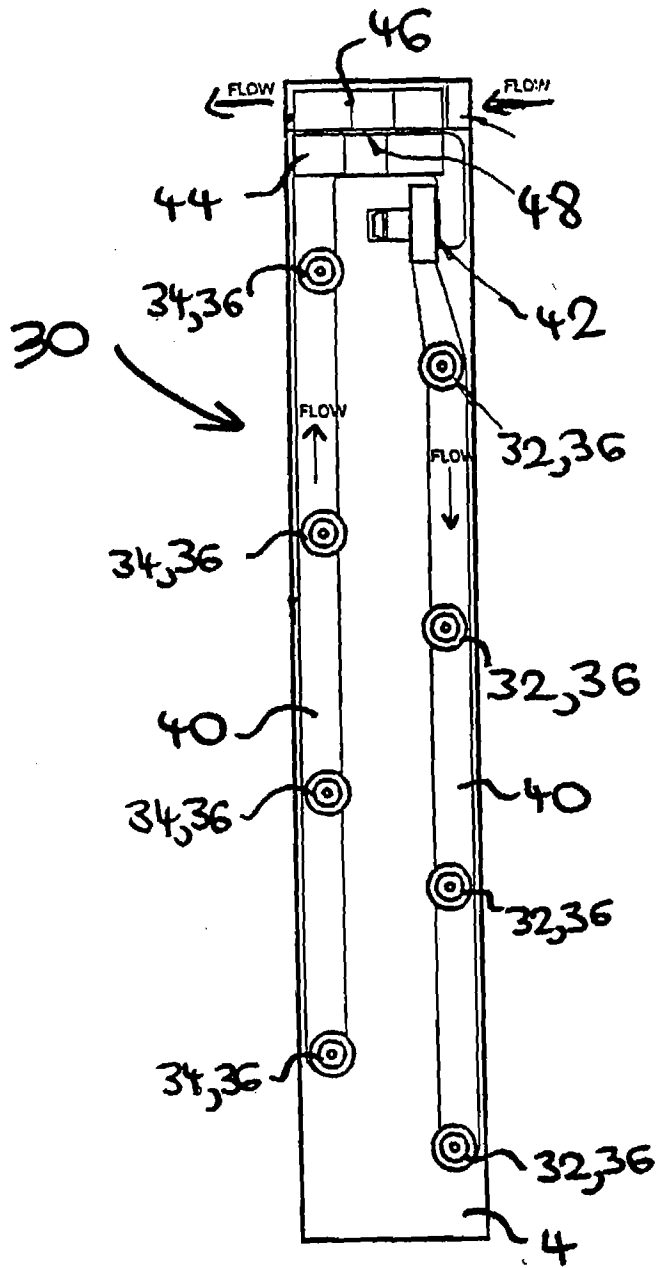
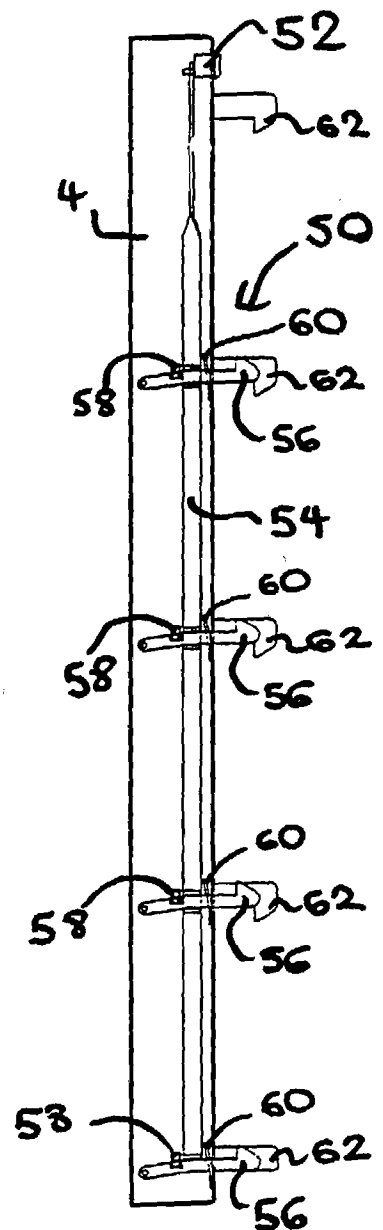


Fig. 5

Fig. 6



GOODS STORAGE APPARATUS

5 The present invention relates to goods storage apparatus,
for example for food delivery, and to a corresponding
method of goods storage.

10 It is known to provide refrigeration units adjacent to
customer premises for storage of food. With the advent of
internet shopping, lockable boxes at customers premises
are known for safe storage of delivered goods ordered over
the internet. Such prior art systems have significant
disadvantages.

15 The present invention provides goods storage apparatus
comprising at least one thermally-insulating crate, each
crate having an inlet and an outlet for temperature
controlled air, and a crate-receiving post comprising
means to provide temperature controlled air, the post
being adapted to receive a plurality of said crates and
20 via which the temperature controlled air is circulated in
use from the means for providing temperature controlled
air to each of said crates received by the crate-receiving
post.

25 This apparatus allows goods such as food to be transported
in crates to a customer's home and stored securely and in
a temperature controlled manner near the customer's home.
By engagement with the post, the crates are held shut.

30 Preferably the temperature controlled air is cooled air.
Preferably each crate has an air inlet lower than its air
outlet for good air circulation. Each crate preferably

has recesses for engagement with corresponding catches of the post so as to mount the crate to the post.

The post preferably can receive up to four crates.

5 Preferably the post has opposed catches which locate into corresponding recesses in the crates for engagement. Of each set of opposed catches, at least one is movable between a crate-release position and a crate-engage position. Preferably a lock is provided to lock all
10 received crates to the post until unlocked by a permitted user. The post is preferably mountable on or against a wall of a building.

15 Preferably the means for providing temperature controlled air is operative to selectably provide heated or cooled air.

The present invention also provides a thermally insulating crate including an inlet and outlet for temperature
20 controlled air and recesses adapted to receive corresponding catches of the post onto which the crate is mountable.

25 The present invention also provides a crate-receiving post adapted to receive a plurality of crates and to provide each crate received with temperature controlled air, the post comprising means to provide temperature controlled air.

30 The present invention also provides a method of goods storage comprising:

- (1) providing goods in thermally-insulated crates, each crate having an inlet and an outlet for temperature controlled air,
- 5 (2) mounting the crates to a crate-receiving post adapted to receive a plurality of said crates, the post comprising means for providing temperature controlled air,
- 10 (3) circulating the temperature controlled air to each of the crates received by the crate-receiving post.

Preferred embodiments of the present invention will now be
15 described, by way of example and with reference to the drawings, in which:

Figure 1 is a perspective front view of an insulating
crate in an open configuration,

20

Figure 2 is a perspective front view of a wall unit adapted to receive up to four insulating crates,

Figure 3 is a perspective front view of the wall unit
25 according to Figure 2 with one insulating crate fitted,

Figure 4 is a perspective front view of the wall unit with three insulating crates fitted,

30 Figure 5 is a simplified diagrammatic cross section in the plane A-A shown in Figure 2 but not showing the locking system, and

Figure 6 is a simplified diagrammatic cross section in the plane B-B shown in Figure 2 but not showing the cold air system.

5 Food is provided in insulated crates 2 as shown in Figure 1 which are docked with the wall unit 4 shown in Figure 2 of the home delivery system and explained in more detail below.

10 Insulated crate

Each insulated crate 2 consists of a base 6 and lid 8 both of which are thermally insulated in a similar way to a traditional cool box, for example by being double-skinned.

15 Each crate 2 has an inlet 10 and an outlet 12 for the passage of chilled air from the wall unit 4. The inlet 10 is configured to be nearer the bottom 14 of the crate 2 and the outlet is configured to be nearer the top 16 of the crate. Circulation of the air through the crate 2 is achieved via ribs (not shown) moulded into the inside walls 18 to ensure that when the crate is full, air circulates properly through the crate 2.

25 The size and proportions of the crate are selected to be optimum bearing in mind:

a) a base area i.e. footprint is selected which gives the best compromise in terms of mounting options outside a range of differing homes,

30

- b) the crate 2 when loaded will have a maximum weight that a slightly built person can be assumed to easily lift,
- 5 c) the volume of the crate 2 relates in some way to the size of a supermarket shopping basket so the customer can equate to some degree the amount that is ordered to the maximum possible storage space that the home delivery system offers,
- 10 d) that supermarkets may have particular preferences due to their existing warehousing and infrastructure requirements,
- 15 e) that the crates 2 are a suitable size to cope with various common sizes of grocery packaging e.g. milk cartons, toilet rolls, etc.

Each crate 2 has two comfortable lifting handles 20, and is shaped and configured so as to be easy to clean, inside and out.

In some embodiments, the crates can be stacked when empty for example by having bases shaped to allow stacking when the crates are in an open configuration.

Each crate 2 can be engaged with and locked securely into the wall unit 4.

30 The crates 2 are made from a suitable material able to withstand harsh frost conditions of around -15°C to full sun $+50^{\circ}\text{C}$. Each crate 2 also resists detergents and boiling water used when the crate is cleaned.

The lid 8 of a crate 2 is hinged to the base 6 or, in other embodiments (not shown) otherwise joined to the base 6, in such a way that lid 8 cannot be raised when the front 22 of the lid 8 is held in the wall unit 4.

5

In some other embodiments (not shown), each crate has an external catch or catches to hold the lid on during transit.

10 The lid 8 is strong enough to deny easy access through the side edge 24 of the crate 2 when the crate 2 is docked in the wall unit 4.

The seal (not shown) between the lid 8 and the base 6 is
15 reasonably good so as to reduce chilled air loss to an acceptable level.

Wall unit

20 As shown in Figure 2, the wall unit 4 has a small footprint so as to minimise the volume that the wall unit 4 takes from the crates (see corresponding recessed portions 26 of each crate 2) and to minimise the obstruction which the wall unit 4 causes when no crates 2
25 are docked.

The wall unit 4 is able to hold a number of crates 2, specifically four crates 2; however, in other embodiments (not shown) the number may vary dependent on the
30 proportions of the crates which are selected. Different sizes of wall unit are possible which hold more (or less) crates 2.

As in use the wall unit 4 will most likely be fixed to a wall (not shown) of a building (not shown), the wall unit 4 includes fasteners (not shown) to make this simple, with, in some embodiments, the provision of a template (not shown) for mounting purposes. Special kits (not shown) for post and door mounting can be provided so as to increase the mounting possibilities.

The wall unit 4 is powered in use by a 12V supply connected inside the customers home. This allows the wall unit 4 to be plugged into a standard wall socket (not shown) thus keeping installation simple. The unit, of course, meets all relevant regulations.

As shown in Figure 5, the wall unit 4 has a recirculating cold air system 30 that feeds cold air into each crate 2 via first ports 32. The warmer air expelled from the crates via outlets 12 is ported back via second ports 34 into the wall unit 2 to be cooled again. This is more efficient than continually cooling fresh air.

The air cooling system 30 includes internal ducting 40 through which the cold air is circulated by blower 42 to the first ports 32 and from the second ports 34.

If a crate 2 is not present the first and second ports for it are shut to ensure practically no wastage/leakage of chilled air.

Each of the first ports 32 and second ports 34 has a rubber seal 36, to minimise losses.

In order to extract the heat from the cooling system 30, air from outside is drawn in and passed through a first heat sink 46 of a heat exchanger 38 and expelled. The heat exchanger 38 includes a further heat sink 44 through which the cooled air passing via the internal ducting 40 passes.

Between the two heat sinks 44, 46 of the heat exchanger 38, there is a TEC (thermoelectric cooling device, 48). This optionally provides warmed rather than cooled air which may be useful, for example, if the outside temperature is below freezing or to keep hot food deliveries hot.

As shown in Figure 6, the wall unit 4 has a self latching locking system 50 for locking all of the inserted crates 2. The locking system 50 consists of a barrel lock 52 for use with a key (not shown) which is connected by a mechanical link 54 to the movable catches 56. There are four movable catches 56 disposed so that one is for each crate. Each movable catch 56 is spring biased by a return spring 58 and has an associated tamper shield 60.

The locking system 50 is released by the customer using his or her key.

In alternative embodiments (not shown) various forms of electronic locking systems are provided instead, ranging from a keypad mounted on the unit or inside the home, to a wireless or infrared remote control system. However, in most cases, a mechanical override is likely to be required to release the crates in the event of a malfunction.

For each crate 2, a pair of fixed catches 62 are provided disposed for engagement with a corresponding recessed portion of a crate 2. Thus upon the crate 2 being applied to the wall unit 4, a crate is essentially held between its respective fixed catches 62 and corresponding movable catch 56; the fixed catches 62 engaging with a corresponding recess in the lid 8 of the crate 2, and the movable catch 56 engaging with a corresponding recess in the base 6.

Empty crates (or crates otherwise intended for return) are mountable on the wall unit 4 with the locking system 50 temporarily deactivated (i.e. unlocked) so as to allow collection of the crates. In alternative embodiments (not shown) a secondary locking system is provided to allow empty crates to be collected. The deactivation of the locking system 50 (or activation of the secondary locking system) temporarily switches off the cold air system 30.

How the apparatus is used

An example of how the apparatus is used is as follows:

(a) The customer orders the goods from the supermarket via the Internet, phone or by other means.

(b) The order is packed into the insulated crates 2 at the supermarket or pick-and-place warehouse. The crates 2 are specifically designed in terms of size, etc. to suit the existing supply side infrastructure.

(c) The crates 2 are delivered in chilled delivery vans (not shown) via the existing delivery infrastructure (warehouses etc.).

(d) The crates 2 are docked onto the wall unit 4 (as shown in Figures 3 and 4) which is located at the front of the customers home. Once docked, the crates 2 automatically lock in place and cannot be removed other than by the customer and, depending on the locking system adopted, the delivery operative and/or the crate collection operative. Additionally the lid 8 cannot be removed when a crate 2 is docked with the wall unit 4 as explained above.

(e) The action of docking the crates 2 with the wall unit 4 connects the inlet port 10 and outlet port 12 of the respective crate to the air ducting system i.e. cold air system 30 in the wall unit 4. This also activates the cold air system 30 which monitors the air temperature in the crates 2 and circulates chilled air through them as required.

(f) The customer arrives home and removes the crates 2 through the use of a key or electronic code system. Removal of the crates 2 acts to switch off the air cooling system.

(g) Empty crates 2 are re-docked with the wall unit 4 by the customer ready for collection at the time of the next delivery or at a prearranged or predetermined time by the Supermarket or subcontractor.

Some Advantages

The preferred system has significant advantages. For example:

(a) The customer does not have to be in to receive the goods.

5 (b) The use of crates is integrated into the supermarkets delivery/warehousing infrastructure which means there is no re-packing of the goods at the delivery address. This ensures the groceries are maintained in the best possible condition (i.e. as packed by the supermarket), groceries cannot go missing thus minimising the risk of disputes with customers, and the delivery operative's time and hence cost overhead is also minimised.

15 (c) The docking of the crates 2 with the wall unit 4 does not involve the use of any keys, chains or other security devices. All functions are practically automatic thus minimising the possibility of errors by the delivery operative. The docking action is almost as simple as just putting the crates on the ground and may take less time than if the customer were present to receive the goods. This again minimises the delivery operative's time and hence cost overhead.

25 (d) The modular nature of the system means that for most of the time, when no crates 2 are docked with the wall unit 4, the system has a minimal footprint and therefore causes virtually no impediment to paths, passageways, doorways etc. This fact greatly increases the number of possible mounting positions for the unit at a given site and hence the potential applicability of the system. For the same reason the unit will be visually unobtrusive when not in use which reduces possible resistance to its take-up by consumers.

(e) Deliveries from more than one supermarket or retailer can be mounted on the unit at the same time providing the maximum number of crates 2 fitted to wall unit 4 is not exceeded.

5

Advanced feature possibilities

Alternative embodiments (not shown) incorporate various technologies to improve operating characteristics from the point of view of both the supermarket and the customer; these include:

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- Electronic tagging of the crates: This would allow the retailer to track the crates through their system to the delivery address. The wall unit detects a delivery and communicates the crate reference, delivery time etc. back to the retailer via a modem or mobile phone technology. This information could be available to the customer via the retailers websight.

20

- The system could detect the presence of empty crates and, using the communication system outlined above, communicate to the retailer that empty crates were awaiting collection.

25

- A control unit mounted inside the home could communicate with the wall unit via wireless technology, such as Bluetooth wireless technology. The control unit could provide control of the security code functions and be connected to the Internet to allow direct ordering of groceries.

30

CLAIMS:

1. Goods storage apparatus comprising at least one thermally-insulating crate, each crate having an inlet and an outlet for temperature controlled air, and a crate-receiving post comprising means for providing temperature controlled air, the post being adapted to receive a plurality of said crates and via which the temperature controlled air is circulated in use from the means for providing temperature controlled air to each of said crates received by the crate-receiving post.
2. Goods storage apparatus according to claim 1 in which in use the temperature controlled air is returned via the post to the means for providing temperature controlled air after passing through one or more of said crates.
3. Goods storage apparatus according to claim 1 or claim 2, in which each of said crates has its respective inlet nearer the base of the crate and its outlet nearer the lid of the crate.
4. Goods storage apparatus according to any preceding claim, in which each crate has recesses for engagement with corresponding catches of the post so as to mount each of said crates to the post in such a way that the crates mounted on the post are held shut.
5. Goods storage apparatus according to any preceding claim, in which the post is adapted to receive up to four crates.

6. Goods storage apparatus according to any preceding claim, in which the post is provided with for each crate to be received at least two opposed catches, the catches acting in use to hold the crate therebetween.

5

7. Goods storage apparatus according to claim 6, in which at least one of said at least two opposed catches is movable between an open position for crate reception and a closed position for holding the crate.

10

8. Goods storage apparatus according to any preceding claim including a lock operable to lock all received crates to the post until released by a permitted user.

15

9. Goods storage apparatus according to any preceding claim, in which the post is mountable on or against a wall of a building.

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10. Goods storage apparatus according to any preceding claim, in which the means for providing temperature controlled air is operative to selectably provide heated or cooled air.

25

11. A thermally-insulating crate for use with a crate-receiving post, the crate including an inlet and an outlet for temperature controlled air and engagement means to secure the crate to the post.

30

12. A thermally-insulating crate according to claim 11, in which the engagement means are recesses adapted to receive corresponding catches of the post onto which the crate is mountable.

13. A crate-receiving post adapted to receive a plurality of crates and to provide each crate received with temperature controlled air, the post comprising
5 temperature controlled air providing means.

14. A crate-receiving post according to claim 13, comprising engagement means to secure each crate received to said post.

10

15. A method of goods storage comprising:

(1) providing goods in thermally-insulated crates, each crate having an inlet and an outlet for
15 temperature controlled air,

20

(2) mounting the crates to a crate receiving post adapted to receive a plurality of said crates, the post comprising temperature controlled air providing means,

(3) circulating temperature controlled air to each of the crates received by the crate receiving post.

25 16. Goods storage apparatus substantially as hereinbefore described with reference to the drawings.

17. A method of goods storage substantially as hereinbefore described with reference to the drawings.

CLAIMS:

1. Goods storage apparatus for groceries and the like for delivery to and storage at a consumer destination, the apparatus comprising at least one thermally-insulating crate, each crate having an inlet and an outlet for temperature controlled air, and a crate-receiving post comprising means for providing temperature controlled air, the post being adapted to receive a plurality of said crates and via which the temperature controlled air is circulated in use from the means for providing temperature controlled air to each of said crates received by the crate-receiving post.
2. Goods storage apparatus according to claim 1 in which in use the temperature controlled air is returned via the post to the means for providing temperature controlled air after passing through one or more of said crates.
3. Goods storage apparatus according to claim 1 or claim 2, in which each of said crates has its respective inlet nearer the base of the crate and its outlet nearer the lid of the crate.
4. Goods storage apparatus according to any preceding claim, in which each crate has recesses for engagement with corresponding catches of the post so as to mount each of said crates to the post in such a way that the crates mounted on the post are held shut.
5. Goods storage apparatus according to any preceding claim, in which the post is adapted to receive up to four crates.

6. Goods storage apparatus according to any preceding claim, in which the post is provided with for each crate to be received at least two opposed catches, the catches acting in use to hold the crate therebetween.

5

7. Goods storage apparatus according to claim 6, in which at least one of said at least two opposed catches is movable between an open position for crate reception and a closed position for holding the crate.

10

8. Goods storage apparatus according to any preceding claim including a lock operable to lock all received crates to the post until released by a permitted user.

15

9. Goods storage apparatus according to any preceding claim, in which the post is mountable on or against a wall of a building.

20

10. Goods storage apparatus according to any preceding claim, in which the means for providing temperature controlled air is operative to selectably provide heated or cooled air.

25

11. A method of goods storage comprising:

(1) providing goods, in the form of groceries and the like, in thermally-insulated crates, each crate having an inlet and an outlet for temperature controlled air,

30

(2) mounting, at a consumer destination, the crates to a crate receiving post adapted to receive a plurality of said crates, the post comprising temperature controlled air providing means,

(3) circulating temperature controlled air to each of the crates received by the crate receiving post at the consumer destination.

5 12. Goods storage apparatus substantially as hereinbefore described with reference to the drawings.

13. A method of goods storage substantially as
hereinbefore described with reference to the drawings.



INVESTOR IN PEOPLE

Application No: GB 0103559.1
 Claims searched: 1,15

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Examiner: M C Monk
 Date of search: 9 August 2001

Patents Act 1977

Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): B8P (PV); F4H (H1A, H1B, H2A, H2B)

Int Cl (Ed.7): F25D (17/08)

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2333828 A	BLUE FUNNEL LINE LTD See for example the stack of containers in Fig.1; and a container having an inlet and outlet in Fig.3.	1-3,5,15 at least
X	GB 2131537 A	STAL REFRIGERATION AB Consider whole document; see for example the stack of containers in Fig.1 and the height adjustment means of Figs.7 & 8.	1-3,5,15 at least
X	GB 1594507	COMPAGNIE GENERALE D'ENTRETIEN ET DE REPARATION COGER Consider whole document; installation for distributing refrigerated air into stacked containers.	1,2,5,15 at least
X	GB 1558825	SVENSKA FLAKTFABRIKEN AB Air duct (3) divided into fresh air passage and spent air passage for a stack of containers.	1,2,5,15 at least
X	GB 1458165	GRUNZWEIG & HARTMAN UND GLASFASER AG Consider whole document; elastic sealing rings (16) couple the vertical support column to the connections (5,6) on the containers in the stack.	1-3,5,15 at least

X Document indicating lack of novelty or inventive step

Y Document indicating lack of inventive step if combined with one or more other documents of same category.

& Member of the same patent family

A Document indicating technological background and/or state of the art.

P Document published on or after the declared priority date but before the filing date of this invention.

E Patent document published on or after, but with priority date earlier than, the filing date of this application.



INVESTOR IN PEOPLE

Application No: GB 0103559.1
Claims searched: 1,15

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Examiner: M C Monk
Date of search: 9 August 2001

Category	Identity of document and relevant passage		Relevant to claims
X	GB 1400685	GRUNZWEIG & HARTMAN UND GLASFASER AG Consider whole document; especially the arrangement as shown in Fig.9.	1-3,5,15 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.